YGE L-series 60HV and 90HV electronic speed controller (ESC)
Operating instructions and data sheet

Technical data:

- The specified current is the maximum continuous full power current with adequate cooling.
- 4 to 12s LiPo, with under voltage protection by power reduction.
- 12 to 36 cells NiMH, with under voltage protection by power reduction.
- Disconnectable under voltage detection.
- Optocoupler. Receiver Battery can be use up to 9V.
- Speed regulation (Governor mode).
- Soft start.
- Active free-wheel, allowing unlimited part load operation.
- Automatic or 6 step adjustable timing.
- Continuously adjustable F3A brake.
- 3 steps adjustable regular back EMF brake.
- Switching rate: 8 to 16 kHz
- Speed limit: 240,000 RPM (2-Pole motors)
- Temperature and overload warning
- Anti sparkling circuit
- Programming with the ProgCard II or III

Typ	60A	90A
Overall dimensions in mm	67 x 31 x 11	73 x 31 x 19
Weight in g without/with wires	37 / 49	53 / 79
Cable diameter Battery/Motor	$2{,}5^2$ / $2{,}5^2$	4^2 / 4^2

Initial setup:

When the battery is connected (red = plus, black = minus) you will hear 3 descending tones. When connecting 4s to 6s Lipo you will hear several beeps according to the number of cells. With high cell packs (7 to 12s Lipo) follow 2 high and 2 deeper tones. In case the transmitter stick is on throttle off, you will hear now 3 ascending tones.
You need to connect the motor to hear the beeps, as it is the motor itself which acts as a speaker.

If the motor turns in the wrong direction, you only have to change 2 of the 3 motor wires.

Use only clean and tight gold connectors for motor and battery. The 4mm PK connectors have proven to be the best choice for currents from 30 to 90A. Pay attention for the battery connector to choose a polarity safe system. Exchange low-friction or oxidized plugs and sockets. Because only tight sitting contacts will ensure a high current flow, protect the speed controller against dangerous voltage peaks and avoid disturbances. On the other side, with all ESC types, the entire wire length, from the controller to the battery, may not exceed 20cm. If longer wires are necessary, a Low ESR switching capacitor of 220µF/50V should be soldered between plus and minus wires every 20cm. You might also consider using our capacitor module YGE Cap´s typ 7.
Likewise the motor wires can be extended. Then please twist the 3 lines, in order to minimize interference emission.

Note: Inverting the Battery polarity leads to heavy damage and to the loss of warranty!!!

General Settings:

The speed controller has a fixed throttle curve setting, so that with all usual transmitters the stop and full power points are linearly connected. With all programmable transmitters, the throttle range should be set to default (±100%), the center point set to zero and throttle trim enabled. Nevertheless, with some transmitter types the range needs to be adjusted. For that the throttle endpoints have to be set so that one notch before lowest stick position the motor is stopped and that one notch before full power the motor is actually at full power. Full power is indicated by the LED that is completely turned off.

On delivery the Timing is adjusted to 18°, brake is switched on middle, and the under voltage recognition adjusted to Lipo mode 3.1 V.

If you hear rpm variations (wowing or erratic sound) during the run-up, the timing should be increased. If there is no improvement at 30°, the motor is overloaded. A smaller propeller, a one cell smaller battery or a stronger motor will help. If after motor stop you hear 2 repeating beeps, it means that the battery voltage dropped down below the setting value. Try a cutoff voltage of 2.9V per cell. If there is still no improvement, then the battery is discharged or too weak, the wires are too long or to small or a connector is out of order.
With an active brake you can hear these warning tones only in windmill position. This is the small range on the throttle stick between brake and motor start. You can reach this position with 2 notches or with a high trim and a short gas start.

If you do not want automatic timing, you can adjusted it accordingly with the following guideline.

Innrunner 0 to 12°
Outrunner 18 to 30°
If your motor manufacturer gives a timing recommendation, you should use it.
Basic rule: the higher the timing, the higher the full power rpm.

It is very easy to change with the ProgCard. It is also possible to perform the setup with the transmitter;

however it will not be explained here. You will find it in the RC-setup manual under www.yge.de in the Download area.

In case you get into the programming mode by mistake during a normal start-up (throttle stick at full power), just disconnect the battery, lower the stick to stop, and connect the battery again. Thus you won't change the adjustments.

Helicopter settings

For helicopters in governor mode, the full throttle range (100%) must be calibrated once. For some transmitters, this range is indicated in the helicopter menu (throttle curve 0-100%). This throttle curve will then correspond with the controller throttle from 0 to 100%. Please also check the ProgCard or RC-Setup manual.

When activating one of the governor modes, all relevant heli parameters are set to default. This default will fit nearly all setups. **Initially you don't need to program anything else.**

Here a list of the default settings.

- Timing = 18°
- Brake off
- Act. Freew. on
- P-Gain = 0,9
- I-Gain = 0,05
- Startup Speed = Heli middle
- PWM-Frequency = 8 kHz)
- Startup Power = Auto 1-32% (sometimes is better 2 or 4%)

You should modify these parameters only, if you don't get the desired success and if you are sure of all other components.

Lipo protection / under-voltage protection:

Because of the tension driven load adjustment, it is possible to fly further with low power, since the battery recovers with smaller load. However, if the tension continues to break in, the motor is switched off.

Active free-wheel:

The unlimited partial load capability refers to the maximum full power current of the 60 and 90A ESC types.

Temperature / overload warning:

If the speed controller's temperature exceeds its limit, because of overloading or lack of cooling, after landing and/or motor stop, a warning signal is issued (3 Beeps in the interval). But the motor is **not switched off** in flight unless the temperature becomes extremely critical.

The partial load operation between half and nearly full power is the most difficult area for an ESC. In addition the running time becomes longer and longer with the Lipo technology. If it should come to repeated temperature warnings, better cooling should be provided or current should be reduced. These warnings are to be regarded as overload warnings and **not as normal operating condition**. Because at high temperature the components are strongly stressed, this leads to a decreased life time. You achieve a better cooling not only through sufficiently dimensioned air intake, but even more efficiently through a larger air outtake, in order to avoid a heat accumulation.
You achieve smaller currents by using a smaller propeller or a one cell smaller battery.

Opto coupler:

In the case of the use of an external BEC the galvanic separation of the opto-coupler is bypassed, which can possibly feed disturbances through to the receiver. Here we recommend the use of our ferrite core for additional filtering.

Caution:

As a rule it is important to make sure that no objects are within the propeller circle when batteries are connected.
The use of this speed controller is therefore allowed only in situations where damages and personal injuries are impossible. A damaged governor (e.g. broken, damaged by polarity inversion or humidity) should never be used again. Otherwise it might come to malfunctions or failures, respectively.
The ESC may only be powered of batteries, it is not allowed to use power supplies.

Trouble shooting:

1 Beeps/flashes: stick position and / or speed for Gov.-Store not taught correctly.
2 Beeps/flashes: Under-voltage identification
3 Beeps/flashes: Temperature rise warning
5 Beeps/flashes: Receiver signals failed
6 Beeps/flashes: start up failed

The ESC signals acoustically (motor) and optically indicating a blinking LED light any error which occurred during the flight
Errors 2 and 3 are signaled after motor stop, but aren't stored as long as the ESC didn't cut off completely (low voltage / temperature warning). In case the error led to a complete cut off, then it is not cleared by a tension RESET. The deletion can only be carried out by connecting the battery with the stick at full power and/or with 100% throttle pre-selection (throttle curve), and disconnecting it again after the interval beep. Please leave the stick on full power, whien disconnecting; otherwise you will activate the RC-Setup.
On the other hand, the errors can be cleared by activating the ProgCard.
If the brake is activated, the error is only displayed after a tension reset or in wind milling position.

Warranty:

We give 6 months warranty on this speedcontroller. Any other requirements are excluded. This applies in particular to requirements for material damage or personal injuries compensation due to malfunction or failure. For damages to property or personal injuries and their consequences, which developed from our supply or craftsmanship, we do not take any liability, since we have no control on handling and use.